

CLAIMS

1. A surface treating method of substrate wherein an electrically conductive substrate is placed in a process chamber wherein the pressure is maintained between 0.001 ~ 1 atmospheric pressure, ultraviolet having a photon energy of 3 ~ 10 eV is irradiated from a light source housed in a process chamber having a light output window while a negative bias voltage is applied to the substrate, and a process gas is supplied into the process chamber to treat the surface of the substrate.
2. The surface treating method of substrate according to claim 1, wherein the process gas contains raw material components, and a film made from said components is formed on the substrate.
3. The surface treating method of substrate according to claim 2, wherein the raw material components are carbon and hydrogen and a diamond-like carbon film is formed on the substrate.
4. The surface treating method of substrate according to claim 1, wherein the process gas contains a component reactive with the substrate material and a film resulting from the reaction between said component and the substrate is formed on the substrate.
5. The surface treating method of substrate according to claim 4, wherein the component reactive with the substrate material is any one of oxygen, nitrogen or carbon, and any one of oxide film, nitride film or carbonized film is formed.
6. The surface treating method of substrate according to claim 1, wherein the process gas contains a non-reactive component and the collision of said component results in the flattening of the substrate surface.
7. The surface treating method of substrate according to any one of claims 1 ~ 6, wherein a mesh electrode placed in the opposite direction to the substrate is provided within the process chamber, and a bias voltage negative on the substrate side is applied between said electrode and the substrate.
8. The surface treating method of substrate according to any one of claims 1 ~ 7, wherein the pressure within the process chamber is maintained between 0.01 ~ 0.5

atmospheric pressure.

9. The surface treating method of substrate according to any one of claims 1 ~ 8, wherein ultraviolet having a photon energy of 4 ~ 9 eV is irradiated.

10. The surface treating method of substrate according to any one of claims 1 ~ 9, wherein a discharge-type lamp such as low-pressure mercury lamp is used as a light source of ultraviolet.